

In re Patent Application of:  
**GOLDSTEIN**  
Serial No. 10/060,497  
Filing Date: JANUARY 30, 2002

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#### REMARKS

The Examiner is thanked for the thorough examination of the present application. In view of the arguments presented in detail below, it is submitted that all of the claims are patentable.

#### I. The Claimed Invention

The present invention is directed to a phased array antenna. As recited in independent Claim 1, for example, the phased array antenna includes a substrate and a plurality of spaced apart phased array antenna elements carried by the substrate. Moreover, the phased array antenna elements are arranged along an imaginary Archimedean spiral. In contrast to typical prior art element configurations, the claimed arrangement of phased array antenna elements along an Archimedean spiral advantageously allows for the reduction of grating and/or high gain signal side lobes while also providing relatively easy scalability for different applications.

Independent Claim 12 is directed to a similar phased array antenna, and independent Claim 18 is directed to a related method for making a phased array antenna. Each of these claims similarly recites phased array antenna elements arranged along an imaginary Archimedean spiral.

#### II. The Claims Are Patentable

The Examiner rejected independent Claims 1 and 18 over

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Jeon (U.S. Patent No. 5,327,146), and independent Claim 12 was rejected over Jeon in view of Vail et al. (U.S. Patent No. 6,522,294). In particular, Jeon is directed to a dipole array antenna which includes a conducting substrate, a feeder layer, and a dipole layer. The feeder layer is spirally formed by etching a first thin film on the dielectric layer. The feeder layer is placed on a conducting substrate and a connector is attached to the feeder layer. The dipole layer is placed on a second dielectric layer deposited on the feeder layer to prevent energy loss from the feeder layer by etching a second thin film.

The Examiner contends that Jeon teaches a phased array antenna. The Examiner also contends that the "sprially" formed feeder 6 illustrated in FIG. 3 of Jeon (along which dipoles 4, 5 are arranged) is arranged in an Archimedean spiral. It is respectfully submitted that the Examiner has mischaracterized Jeon, as this patent neither teaches a phased array antenna nor an arrangement of phased array antenna elements along an imaginary Archimedean spiral.

More particularly, as the field of the invention clearly sets forth, Jeon is directed to a circularly polarized dipole array antenna for receiving signals from satellites. That is, such an antenna would only be capable of producing a fixed, circularly polarized boresight beam. In contrast, phased array antennas are typically used to provide electrical steering of a main antenna beam. Indeed, the feeder structure of Jeon is not appropriate for such phased array antenna applications, as this

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structure provides no capability for electrically steering an antenna beam. Thus, in a phased array antenna, other components (e.g., phase shifters) would be used in place of such a feeder structure.

For this reason, it would also be improper to combine the teachings of Vail et al. with Jeon. While the Examiner correctly notes that Vail et al. teaches a phased array antenna including a central controller and a plurality of element controllers, these teachings simply cannot be combined with those of Jeon. That is, to attempt to make the circularly polarized dipole array antenna of Jeon into a phased array antenna with element controllers as the Examiner proposes would change the principle of operation of the Jeon antenna array, and also render this array unsatisfactory for its intended purpose.

Moreover, Jeon simply does not teach arranging antenna elements along an imaginary Archimedean spiral. While Jeon does disclose a "spirally" formed feeder, nowhere in the description of this patent does it disclose what type of spiral this is. Further, it is difficult to tell what type of spiral Jeon employs from the rather schematic illustration shown in FIG. 3. If anything, the illustrated spiral appears to be a logarithmic spiral (which is typical of prior art spiral antenna element arrays), not an Archimedean spiral.

Indeed, excepting the special case of a circle where there is only one level, outer levels of a logarithmic spiral are spaced successively radially farther apart from one another.

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Stated alternatively, there is a greater radial distance between outer levels of a logarithmic spiral than between inner levels thereof. As noted on page 8 of the present specification, Applicant theorizes, without wishing to be bound thereto, that it is this disparity in symmetry between the various levels in a logarithmic spiral element array which may lead to high gain side lobes or even grating lobes at wide scan angles in some applications. Further, this problem may become particularly acute as larger logarithmic spirals with more levels and antenna elements are used.

Thus, Jeon fails to teach or fairly suggest phased array antenna elements arranged along an imaginary Archimedean spiral, as do the remaining prior art references of record. Accordingly, it is submitted that independent Claims 1, 12, and 18 are patentable over the prior art. Their respective dependent claims, which recite yet further distinguishing features, are also patentable over the prior art and require no further discussion herein.

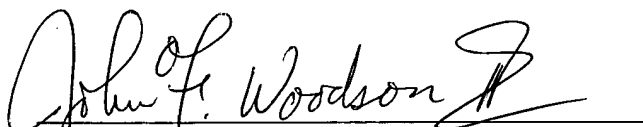
#### **CONCLUSIONS**

In view of the arguments presented above, it is submitted that all of the claims are patentable. Accordingly, a Notice of Allowance is respectfully requested in due course. Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

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Respectfully submitted,

A handwritten signature in cursive script, reading "John F. Woodson, II". The signature is written in dark ink and is positioned above a horizontal line.

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